AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (Currently Amended): An optical modeling device in which a light beam is exposed onto a photo-curable resin to form a three-dimensional model, the device comprising:

an exposure portion for exposing a plurality of pixels within a predetermined region of a surface of the photo-curable resin by using the light beam emitted from a light source and modulated for each pixel in accordance with image data and pulse driven in picosecond pulses; and

a moving portion connected to the exposure portion for moving the exposure portion relative to the surface of the photo-curable resin.

2. (Original): An optical modeling device in which a light beam is exposed onto a photo-curable resin to form a three-dimensional model, the device comprising:

an exposure portion for exposing a plurality of pixels within a predetermined region of a surface of the photo-curable resin by using the light beam emitted from a light source, modulated for each pixel in accordance with image data, and pulse-driven in picosecond pulses; and

a moving portion connected to the exposure portion for moving the exposure portion relative to the surface of the photo-curable resin.

3. (Original): The device of claim 1, wherein the exposure portion comprises the light source, and a spatial light modulator for modulating the light beam emitted from the light source for each pixel in accordance with the image data.

4. (Original): The device of claim 3, wherein the spatial light modulator comprises a digital micromirror device.

5. (Currently Amended): An optical modeling device in which a light beam is exposed onto a photo-curable resin to form a three-dimensional model, the device comprising:

an exposure portion, which is capable of scanning, for exposing a plurality of pixels within a predetermined region of a surface of the photo-curable resin by using the light beam emitted from a light source and modulated for each pixel in accordance with image data and pulse driven in picosecond pulses; and

a moving portion connected to the exposure portion for moving the exposure portion relative to the surface of the photo-curable resin.

6. (Original): The device of claim 5, wherein the exposure portion comprises the light source, and a spatial light modulator array in which spatial light modulators, for modulating the light beam emitted from the light source for each pixel in accordance with image data, are arranged in a first scanning direction.

7. (Original): The device of claim 6, wherein the spatial light modulator comprises a grating light valve or a digital micromirror device.

8. (Original): The device of claim 5, wherein the exposure portion comprises: the light source; a spatial light modulator array in which spatial light modulators for modulating the light beam emitted from the light source for each pixel in accordance with the image data are arranged in a first scanning direction; and a scanning mirror for scanning in a second scanning direction intersecting the first scanning direction.

9. (Original): The device of claim 8, wherein the moving portion moves the exposure portion in the first scanning direction and the second scanning direction intersecting the first scanning direction.

10. (Currently Amended): ~~The device of claim 1, further comprising~~ An optical modeling device in which a light beam is exposed onto a photo-curable resin to form a three-dimensional model, the device comprising:

an exposure portion for exposing a plurality of pixels within a predetermined region of a surface of the photo-curable resin by using the light beam emitted from a light source and modulated for each pixel in accordance with image data;

a moving portion connected to the exposure portion for moving the exposure portion relative to the surface of the photo-curable resin; and

at least one other exposure portion so that there is a plurality of the exposure portions, and the exposure portions are each independently movable relative to the surface of the photo-curable resin.

11. (Currently Amended): ~~The device of claim 5, further comprising~~An optical modeling device in which a light beam is exposed onto a photo-curable resin to form a three-dimensional model, the device comprising:

an exposure portion, which is capable of scanning, for exposing a plurality of pixels within a predetermined region of a surface of the photo-curable resin by using the light beam emitted from a light source and modulated for each pixel in accordance with image;

a moving portion connected to the exposure portion for moving the exposure portion relative to the surface of the photo-curable resin; and

at least one other exposure portion so that there is a plurality of the exposure portions, and the exposure portions are each independently movable relative to the surface of the photo-curable resin.

12. (Currently Amended): An optical modeling device in which a light beam is exposed onto a photo-curable resin to form a three-dimensional model, the device comprising an exposure portion which includes a plurality of exposure units arranged in an array, each exposure unit scanning and exposing a plurality of pixels within a predetermined region of a surface of the photo-curable resin by using a light beam emitted from a light source and modulated for each pixel in accordance with image data and pulse driven in picosecond pulses.

13. (Original): The device of claim 12, wherein each of the exposure units comprises the light source, a condensing optical system for condensing the light beam emitted from the light source, and a deflecting element for modulating the light beam condensed by the condensing optical system for each pixel in accordance with image data.

14. (Original): The device of claim 13, wherein the light source, the condensing optical system, and the deflecting element are enclosed in a package.

15. (Original): The device of claim 13, wherein the deflecting element comprises a two-dimensional microscanner.

16. (Original): The device of claim 1, wherein the light source comprises one of:

a gallium nitride semiconductor laser;

a semiconductor laser excitation solid laser in which a laser beam caused by excitation of a solid laser crystal by a gallium nitride semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted;

a fiber laser or fiber amplifier in which a laser beam caused by excitation of a fiber by an infrared light-emitting semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted; and

a fiber laser in which a laser beam caused by excitation of a fiber by a gallium nitride semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted.

17. (Original): The device of claim 5, wherein the light source comprises one of:

a gallium nitride semiconductor laser;

a semiconductor laser excitation solid laser in which a laser beam caused by excitation of a solid laser crystal by a gallium nitride semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted;

a fiber laser or fiber amplifier in which a laser beam caused by excitation of a fiber by an infrared light-emitting semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted; and

a fiber laser in which a laser beam caused by excitation of a fiber by a gallium nitride semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted.

18. (Original): The device of claim 11, wherein the light source comprises one of:

a gallium nitride semiconductor laser;

a semiconductor laser excitation solid laser in which a laser beam caused by excitation of a solid laser crystal by a gallium nitride semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted;

a fiber laser or fiber amplifier in which a laser beam caused by excitation of a fiber by an infrared light-emitting semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted; and

a fiber laser in which a laser beam caused by excitation of a fiber by a gallium nitride semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted.

19. (Original): The device of claim 1, wherein the light source comprises one of:

a first laser light source in which a gallium nitride semiconductor laser is coupled to a fiber;

a second laser light source in which a plurality of gallium nitride semiconductor lasers is coupled to a fiber through a multiplexing optical system;

a linear laser light source in which a plurality of fibers of at least one of the first laser light source and the second laser light source is arranged in an array so as to emit a linear laser luminous flux; and

an area laser light source in which a plurality of fibers of at least one of the first laser light source and the second laser light source is arranged in a bundle so as to emit a spot laser luminous flux.

20. (Original): The device of claim 5, wherein the light source comprises one of:

a first laser light source in which a gallium nitride semiconductor laser is coupled to a fiber;

a second laser light source in which a plurality of gallium nitride semiconductor lasers is coupled to a fiber through a multiplexing optical system;

a linear laser light source in which a plurality of fibers of at least one of the first laser light source and the second laser light source is arranged in an array so as to emit a linear laser luminous flux; and

an area laser light source in which a plurality of fibers of at least one of the first laser light source and the second laser light source is arranged in a bundle so as to emit a spot laser luminous flux.

21. (Original): The device of claim 11, wherein the light source comprises one of:

a first laser light source in which a gallium nitride semiconductor laser is coupled to a fiber;

a second laser light source in which a plurality of gallium nitride semiconductor lasers is coupled to a fiber through a multiplexing optical system;

a linear laser light source in which a plurality of fibers of at least one of the first laser light source and the second laser light source is arranged in an array so as to emit a linear laser luminous flux; and

an area laser light source in which a plurality of fibers of at least one of the first laser light source and the second laser light source is arranged in a bundle so as to emit a spot laser luminous flux.

22. (Original): The device of claim 1, wherein the light source comprises a plurality of laser light sources, and a multiplexing optical system for multiplexing the laser beams emitted from the plurality of laser light sources.

23. (Original): The device of claim 5, wherein the light source comprises a plurality of laser light sources, and a multiplexing optical system for multiplexing the laser beams emitted from the plurality of laser light sources.

24. (Original): The device of claim 11, wherein the light source comprises a plurality of laser light sources, and a multiplexing optical system for multiplexing the laser beams emitted from the plurality of laser light sources.

25. (Currently Amended): An exposure unit for exposing a plurality of pixels, the unit comprising a light source, a condensing optical system for condensing a light beam emitted from the light source, and a deflecting element for modulating the light beam condensed by the condensing optical system for each pixel in accordance with image data.

26. (Original): An exposure unit for exposing a plurality of pixels, the unit comprising a light source, a condensing optical system for condensing a light beam which is emitted from the light source and is pulse-driven in picosecond pulses, and a deflecting element for modulating the light beam condensed by the condensing optical system for each pixel in accordance with image data and pulse driven in picosecond pulses.

27. (Original): The exposure unit of claim 25, wherein the light source, the condensing optical system, and the deflecting element are enclosed in a package.

28. (Original): The exposure unit of claims 25, wherein the deflecting element comprises a two-dimensional microscanner.

29. (Original): The exposure unit of claim 25, wherein the light source comprises one of:

a gallium nitride semiconductor laser;

a semiconductor laser excitation solid laser in which a laser beam caused by excitation of a solid laser crystal by a gallium nitride semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted;

a fiber laser or fiber amplifier in which a laser beam caused by excitation of a fiber by an infrared light-emitting semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted; and

a fiber laser in which a laser beam caused by excitation of a fiber by a gallium nitride semiconductor laser is wavelength-converted by an optical wavelength-converting element, and emitted.

30. (Original): The exposure unit of claim 25, wherein the light source comprises one of:

a first laser light source in which a gallium nitride semiconductor laser is coupled to a fiber;

a second laser light source in which a plurality of gallium nitride semiconductor lasers is coupled to a fiber through a multiplexing optical system;

a linear laser light source in which a plurality of fibers of at least one of the first laser light source and the second laser light source is arranged in an array so as to emit a linear laser luminous flux; and

an area laser light source in which a plurality of fibers of at least one of the first laser light source and the second laser light source is arranged in a bundle so as to emit a spot laser luminous flux.

31.(Original): The exposure unit of claim 25, wherein the light source comprises a plurality of laser light sources, and a multiplexing optical system for multiplexing the light beams emitted from the plurality of the laser light sources.

32. (New): The device of claim 10, wherein the exposure portions are independently movable in both a first direction and a second direction perpendicular to the first direction wherein both directions are substantially parallel to the surface of the photo-curable resin.

33. (New): The device of claim 11, wherein the exposure portions are independently movable in both a first direction and a second direction perpendicular to the first direction wherein both directions are substantially parallel to the surface of the photo-curable resin.

34. (New): The optical modeling device according to claim 1, wherein the light source comprises a gallium nitride semiconductor laser which is configured to emit light in a wavelength range of 700-800 nm and pulse driven in picosecond pulses.